

IN THE ABSTRACT

ABSTRACT OF THE DISCLOSURE

A method ~~and an apparatus capable~~ of instantaneously forming a surface of an arc-treated material mainly ~~consisting of~~ including graphite into nano-tubes due to arc discharge carried out using a unit like a welding arc torch or the like without necessarily requiring a processing container, resulting in the nano-tube being applied to an electron emission source. A torch electrode acting as a first electrode and the arc-treated material made of graphite and acting as a second electrode are arranged opposite to each other. A potential is applied between both electrodes to generate arc discharge therebetween. A mask having an opening pattern is arranged on the arc-treated material, so that only graphite positioned on portions of a surface of the arc-treated material ~~[[2]]~~ corresponding to openings of the mask are exposed to arc, to thereby be formed into nano-tubes.